

Vertical steam sterilizer

User Manual



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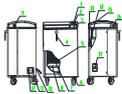
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Preface

1. Instructions

In strict accordance with this manual to install and operate the equipment, incorrect installation and operation will endanger human life and property safety, and to generate the guarantee of equipment performance of manufacturers invalid; In the lifetime of the device, you should make manual intact ; Ensure all updates that you receive can be saved in the manual; When changing equipment user or the use of the site, please ensure that the operating manual must be transferred or transferred as integral part of the equipment.

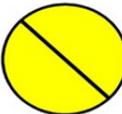
2. Safety sign



It indicates you should pay close attention, prompt the user and maintenance personnel that operation failure, incomplete sterilization and other issues may occur; minor personal injury or equipment damage may be caused.



It prompts the user and maintenance personnel that serious injury or equipment damage may be caused.



This means that must be complied with, otherwise endanger their personal safety.

Before carrying out any operation, maintenance, please read the manual carefully and

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fully understand the contents of each chapter, particularly the ATTENTION content with the above signs.

3. Manual custody:

Manual must be carefully kept, in case of loss or damage, even minor damage should be avoided. The operator is obliged to technically repair, complement manual content which is lost, damaged or no longer applied, catalog and the relevant sections.

Any person, you can not tear or remove any content from the manual under any circumstances. If you're having problems with the manual ,when its instruction does not match the situation or not covering,.Please contact the manufacturer to upgrade. Operation manual saving should keep ventilation and dry, avoiding moisture and heat.

Summarize

Product use scope:

Suitable for sterilization of high temperature, high pressure and humidity resistance medical equipment, medical dressing kits, glassware, rubber, liquid and other items, and it can also be used to sterilize laboratory media.

Specifications

Model	BKQ-B30	BKQ-B50	BKQ-B75	BKQ-B100
Capacity	30L	50L	75L	100L
Chamber size(Φ*L)	385*412 mm	385*515 mm	385*715 mm	385*915 mm
Chamber material	Polished SUS304 medical stainless steel			
Max pressure	0.28MPa			
Rated working pressure	0.165MPa			
Max temperature	150°C			
Working temp range	105~126°C			
Dynamic pulse exhaust time	0~9times			
Power consumption	2.8KW	3KW	3.5KW	4.5KW

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Power supply	220V, 50/60Hz			
Outer size(W*D*H)	610*645*710mm	610*645*850mm	610*645*1000mm	610*645*1200mm
Net weight	68kg	75 kg	85 kg	100 kg

The service life of device is 6 years.



Attention

1. When receive the sterilizer, you should open the sterilizer box, check the equipment for damage and the extent of damage。 Before checking equipment, please pay attention to its packing, retain the packaging material, and check the surface damage. For example, panel scratches, door cover damage, etc.。 Finally, please check the packing list, and check the accessory is whether complete. If found problems, please contact our service department.

2. Sterilizer should be operated strictly in accordance with the instructions described in steps。 If sterilization is not functioning properly, you could consult the fault analysis table in the manual firstly to exclude problems by yourself. If not, you should immediately provide feedback to our service department.If you can provide a detailed failure description of sterilizer, models and the number of parts needed to be replaced, our company deeply grateful for your support!

Basic introduction of the equipment

1、 Product Structure Introduction:

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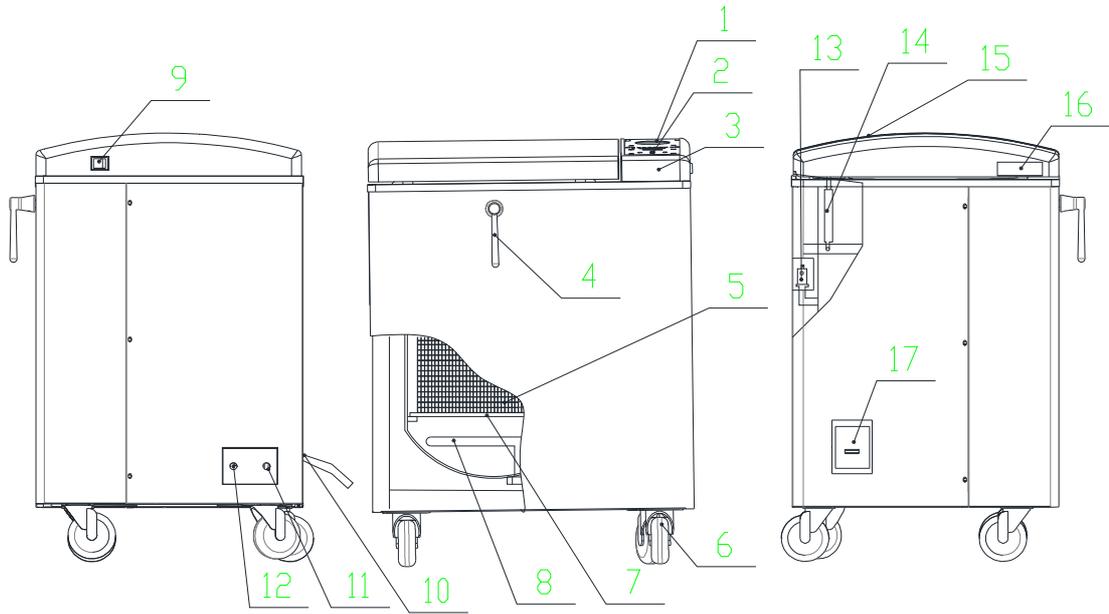


Figure 1

1. Pressure gauge 2. Display panel 3. Control panel 4. Handle 5. Disinfection basket 6. Caster 7. Water retaining bulkhead 8. Heating pipe 9. Power 10. Power wire 11. Exhaust 12. Drain valve 13. Safety valve 14. Power spring 15. Door cover 16. Hand-clasping 17. Air switch

The main features of each component:

No.	Components	Function
1	Pressure gauge	When the device is working, the pressure in the main will be displayed
2	Digital display	Monitoring the entire sterilization process
3	Control panel	Installing the Control Panel
4	Handle	Rotating to open the door
5	Disinfection basket	Basket is used to load sterilization items

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6	Caster	Support equipment and make the equipment move on smooth surface
7	Water retaining bulkhead	Prevent items from splashing by water below.
8	Heating pipe	Heating water to sterilize
9	Power	Operateing power switch of the equipment
10	Power wire	Wire connecting device and power supply (yellow wire is ground wire)
11	Exhaust	Exhaust of cold air and pressure steam
12	Drain valve	discharging chamber waste water
13	Safety valve	To ensure safety by predetermining pressure relief valve
14	Power spring	For easy opening,
15	Door cover	Cover door Components to insulate the heat and protect operators
16	Hand-clasping	Position of clutching door cover when opening the door.
17	Air switch	The main power switch and leakage protection

Operating environment requirements

Sterilization should be placed in a clean, dry, dark, ventilated, small temperature difference and indoor environment.

1. Indoor temperature 5°C-40°C.
2. The maximum relative humidity 85%.
3. Allowable voltage fluctuation range $\pm 10\%$.
4. No dust and pollution indoor.

Safety devices Introduction

BKQ-B Series vertical sterilizer has the following safety devices:

1. Automatic over-temperature protection device: More than programmed temperature, the system automatically cut off the heating power, and display alarm information.
2. Door safety interlock: Safety device prevents the door from opening when there is pressure in the sterilizer.
3. Dry alarm device: When the temperature of the sterilizer chamber is higher than the thermostat set temperature, the thermostat operate, and the system will cut off the heating power (display alarm information).
4. Automatic pressure relief safety valve: Exceeding the set pressure, the safety valve opens to release the pressure.
5. Circuit safety device: AC circuit short protection.

Installation and Adjustment

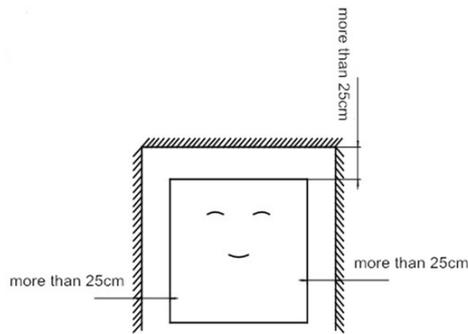
Installation Steps:

1. The placement of the sterilizer:

The BKQ-B series Vertical sterilizer is placed on a smooth, clean, spacious ground,.Then adjust equipment machine feet, make it parallel to the ground, and ensure stable and secure. To ensure good ventilation ,the distance between several side behind the sterilizer and other objects is at least 250mm (Figure 2).



If the sterilizer close to the wall, it may lead to heat build-up inside to cause the failure.



In addition to keep a safe distance from other objects, the existence of other objects should not affect the operation of cutting off the power supply quickly when the equipment fails!

2. The line:

Wires and sockets should be choosed according to the power of the equipment. At the same time, please abide by the local installation and safety rules.

3. The installation of power supply:

Please plug wires with the power socket.

4. Water

Water quality:

Electrical conductivity is lower than $15\mu\text{A}/\text{cm}$

Blench content is less than $2\text{mg}/\text{L}$, hardness is lower than $0.02\text{mm}/\text{l}$

PH:5-7

Water volume: water level in the tank should between high and low water level in about 10kg.

Commissioning procedures:

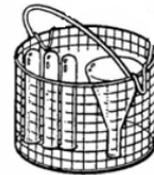
1.Open the door of sterilizer, put the sterilization indicator cards or biological indicator, reset and close the door.

2.Connect the power supply, LCD screen will stay in the following picture for 2 seconds, and then enter the program selection sreen.

The preparatory works before sterilization

Before putting the equipment in the sterilizer, please clean it first in order to avoid damage to sterilizer and sterilized equipment itself caused by residue matters, such as blood and other impurities. We set the cleaning solution for your reference:

- 1) Please clean the sterilizing instruments immediately after usage. You'd better clean it by washing machine, cleaning agent and distilled water.
- 2) After cleaning, it is recommended that the rinse again to ensure its cleanliness.
- 3) When you put the equipment in the sterilization basket, please place the different categories of equipment respectively in different basket, such as stainless steel, carbon steel etc., and there should be appropriate gap between them. If carbon steel will be put in, please put several layers of disinfection mat paper or cotton paper before putting carbon steel, to avoid direct contact with carbon steel and stainless steel.



- 4) Tubes and bottles should be open to the bottom upright when they are sterilized, so that the replacement of cold air and saturated steam could be freely.
- 5) Put a sterilization indicator card in each basket.
- 6) Spore creatures are placed in load test indicator once a month, to detect the sterilization effect.

Boot screen

- 1) The basket is not allowed to overload(12kg), otherwise it will cause inadequate sterilization and dry.
- 2) The package of sterilization equipment should choose breathable packaging materials, such as sterilization bags, sterilization paper, gauze, etc.
- 3) Tubes and bottles should be open to the bottom upright when they are sterilized, so that the replacement of cold air and saturated steam could be freely.

Preparing work before sterilization of rubber:

Please clean the rubber with warm water first, and then place it in a clean sterilization tray. Please ensure that the pipe is two opening of the hollow pipe without any sharp

bend, twist, kink, etc.

Preparing work before sterilization of dressing bag:

Put the dressing bag on the tray vertically, and avoid the contact with the inner wall of the sterilizer.

Preparing work before sterilization of culture medium:

Heat-resistant glass bottles allowed only, and the loading capacity is no more than 2/3 of the volume, the bottle should be sealed in order to avoid medium spillover.

Operation Instructions

1、 Operation instruction

There are 7 programs: 1.# bare instrument, 2# instrument bags, 3#rubber, 4# dressing, 5# liquid type, 6# solid type of custom, 7# liquid typr of custom.

Introduction of interface:

There are 5 keys of “temperature” “time” “▲” “▼” “start/stop” , 8 state indicator of “add water” “warming up” “sterilize” “ exhaust” “done” “alarm” “liquid” and “temperature display”, “time display”.



Figure 2

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Figure 3 Open state



Figure 4 Closed state

The operation steps of opening the door:



1. Left hand hold the door cover buckle position then press down firmly, meanwhile right hand moving the handle counterclockwise.



2. Left hand hold the buckle to lift the door cover.



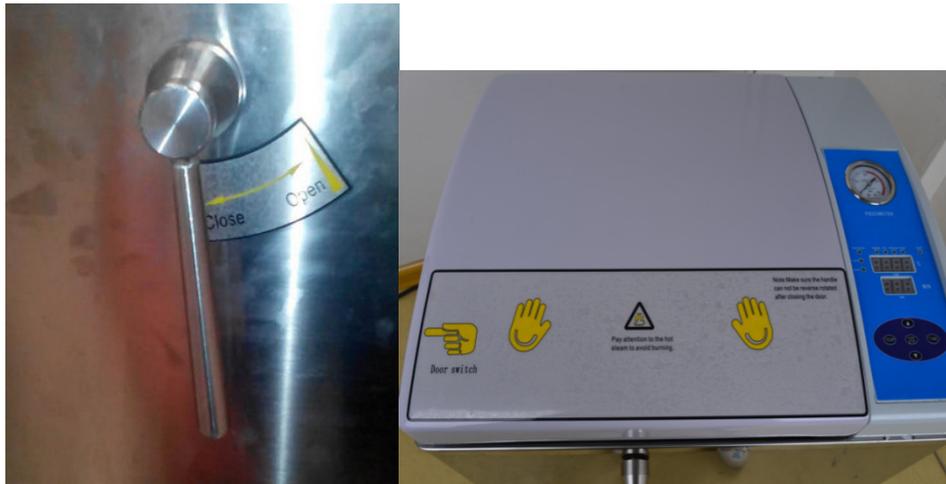
3. Lift the door cover gently, the door automatically bounce.
4. The door open automatically

Note: When open the door note the outflow of steam, keep a certain distance between the human body and the equipment.

The operation steps of closing the door:



1. Left hand pull down the door cover.
2. When the door is being covered, hands on the door cover, press down firmly.



3. Handle straight down, then release the door cover

4. After pressed the door, release the door cover, then grasp the handle counterclockwise rotation, if not turn, the door has been closed.

Operating process:

Plug in power plug for the device, turn on the air switch on the left side, then open the ship type switch on the control panel, display panel lights up, the sterilizer is on standby, display temperature window displays Prog, time window displays digital X(one in 1-7), indicates selection of the X # sterilization procedures, then displays the current temperature and sterilization setting time, two images display alternately.

First open the door, water inside the pot body, until the water level lights off terminate water, then put the disinfection items in the disinfection basket, put the disinfection basket in the sterilizer chamber, the close the door and select the sterilization procedure.

By "▲", "▼" button to select the different sterilization procedures, when selecting the 5 # Liquid program, "**Liquid**" indicator light; When selecting 7 # Liquid custom program, the indicator blinks, prompt the user sterilization process is Liquid, Press the "**Start / End**", the corresponding sterilization program starts.

After sterilization is completed, "**Finish**" lights, meanwhile buzzer beep every 10 seconds, after the "**Finish**" lights, this sterilization ends, after confirming the pressure gauge pointer back to 0, then could open the lid, remove the items.

The custom program can set the sterilization temperature and sterilization time:

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Sterilization temperature setting:

Press the "**Temperature**" button, temperature display window shows the set temperature value and flicker, By "**▲**", "**▼**" to adjust the temperature value, press again "**temperature**" button to preserve the setting temperature value.

Sterilization time setting:

Press the "**Time**" button, the time display window shows the set sterilization time and flickers. Adjust the time value by pressing "**▲**", "**▼**", and then press "**Time**" button to save the time value set.

Parameter setting:

Press "**Start / End**" and "**Temperature**" button at the same time for 5 seconds to enter the menu

Displaying "iwti" indicates the time of adding water, in minutes; press "**Start / End**" the value shows and flickers; turn up and down by pressing "**▲**", "**▼**", and then press "**Start / End**" to confirm. Have to be 0

When "iwti" is displaying, press "**▼**" and then "EATE" would show up; press "**▲**" then "tErF" would show up.

Displaying "EATE" indicates the temperature of the end of discharging cool air; press the "**Start / End**" the value shows and flickers, turn up and down by pressing "**▲**", "**▼**", and then press "**Start / End**" to confirm. The default setting is 100.0 °C

When "EATE" is displaying, press "**▼**" and then "EATi" would show up; press "**▲**" and then "iwti" would show up.

Displaying "EATi" indicates the time of discharging cool air, in minutes; press "**Start / End**" the value shows and flickers, turn up and down by pressing "**▲**", "**▼**", and then press "**Start / End**" to confirm. The default setting is 30 minutes. (After the time of discharging cool air ends, the temperature should not be lower than the set ending temperature of cold air, otherwise it will report error. If the temperature inside the pot is beyond 105 degrees, go directly to the next step)

When "EATi" is displaying, press "**▼**" and then "EWTi" would show up; press "**▲**" and then "EATE" would show up.

Displaying "EWTi" indicates the drainage time, in seconds; press "**Start / End**" the

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value shows and flickers; turn up and down by pressing "▲", "▼", and then press " **Start / End** " to confirm. Only solid program is effective, the default setting is 240 seconds.

When "EWTi" is displaying, press "▼" and then "PULS" would show up; press "▲" and then "EATi" would show up.

Displaying "PULS" indicates the frequency of sterilization pulsation, in seconds; press " **Start / End** " the value shows and flickers; turn up and down by pressing "▲", "▼", and then press " **Start / End** " to confirm. Only custom solid program is effective, the default setting is 0.

When "PULS" is displaying, press "▼" and then "drti" would display, press "▲" and then "EWTi" would show up.

Displaying "drti" indicates the drying time, in minutes; press " **Start / End** " the value shows and flickers; turn up and down by pressing "▲", "▼", and then press " **Start / End** " to confirm. Only custom solid program is effective, the default setting is 10.

When "drti" is displaying, press "▼" and then "tEFA" would show up; press "▲" and then "ESTi" would show up.

Displaying "tEFA" indicates the temperature calibration factor, press " **Start / End** " the value shows and flickers, turn up and down by pressing "▲", "▼", and then press " **Start / End** " to confirm. Users are strictly forbidden to modify.

When "tEFA" is displaying, press "▼" and then "tErF" would display; press "▲" and then "drti" would show up.

Displaying "tErF" indicates the temperature deviation, press " **Start / End** " the value shows and flickers; turn up and down by pressing "▲", "▼", and then press " **Start / End** " to confirm. Users are strictly forbidden to modify

When "tErF" is displaying, press "▼" and then "iwti" would show up; press "▲" and then "tEFA" would show up; and the cycle repeats.

After the modification is complete, press " **Start / End** " and " **Temperature** " button at the same time for 5 seconds to save the parameters and exit the menu.

Production debugging, temperature sensor calibration:

Measure low temperature (10-30) at first (could be replaced with analog temperature probe) to record the actual temperature T1, display temperature D1

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Then measure high temperature (100-130) (can be replaced with analog temperature probe) to record the actual temperature T2, display temperature D2

The result of $(T2-T1) / (D2-D1)$ multiplied parameter K displayed in tEFA menu is the new parameters

After modifying the parameters in tEFA, and then modify the parameters in tErF according to the difference of D3 and T2 displayed in the high-temperature sensor; if the temperature displayed is low, make the value in tErF plus the difference; if the temperature displayed is high, make the value in tErF minus the difference.

Note:

If you want to terminate the sterilization, end the sterilization process by pressing " **Start / End** " button.

Error Indication:

Error code	Fault Causes	Problems Existed	Solutions
Err 001	30 minutes after the discharging of cool air the temperature does not reach the set point.	Heating pipes are broken with air leakage	Replace the heating pipe or inspect whether there is leakage on the pipeline
Err 002	Does not reach the set temperature within the time of cool air discharging or pulsating exhaust fails	Heating pipes are broken, parameters set are unreasonable	Replace the heating pipe or check whether the set parameters are correct
Err 004	After reaching the set temperature, the temperature is not stabilized within 10 minutes or the temperature fluctuates excessively during the sterilization process	There is air leakage	Check the pot connector or the pipe line whether there is air leakage
Err 008	The sensor is not connected or damaged; the	Sensor fails	Replace the sensor

Fastening the connector and testing on-off state once a year, and it should be done by a qualified electrician.

As a result of extreme wear and tear, the door lock device must be inspected every five years.

Instructions: This maintenance manual is provided for professionals. Unless you are a professional, or when the equipment fails, be sure to consult the specification, repair according to the instructions. Instructions have provided maintenance methods for the professionals as many as possible.

Installation and Commissioning

1. Lifting and handling

- (1) Cut off the power.
- (2) Before moving the sterilizer, make sure it is disconnected from the power supply, and no pressure in the sterilizer.
- (3) Drain the water inside the sterilizer away. Lifting and handling should be carried out by many people.

2.Failure Analysis Chart

Phenomenon	Possible Reason	Correction
Turn on the power switch, but the power indicator light is not bright.	1.The breaker is not closed 2.The main power switch is broken down	1.Close the breaker 2.Change the main power switch according to the situation
Under the warming situation, but the temperature but pressure is not rising or rising slowly	1.The control circuit of heater is short or burn down 2.Pipe joint or safety valve is leaking badly	1.Check and change damaged device 2.Check and screw up pipe joint, safety valve etc.
Under draining state, but	Drain filter is blocking	Clear the clutter on the filter

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pressure is not rising or rising slowly		valve core
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3. Change water in the water tank

- 1) Move away the transparent silicone tube to drain, until all water is drained
- 2) Inject distilled water into the sterilization chamber, and stop injecting till the alarm indicator light is not bright

4. The cleaning procedure of steam escape valve: (use the car recirculation device)

Picture 9 indicate the location of steam escape valve in the water tank

First cut down the power to make sure there is no pressure inside the sterilizer

- 1) Move away the water tank cover
- 2) Wash the steam escape valve hole by stretching before and after the steam escape valve core
- 3) Change the steam escape valve if needed, but waiting the device cooling and pressure down to 0MPa before change.

5. Check safety valve

It locates at the top left of the device.

To prevent the safety valve is in the lock status, let the steam pressure through it to release every two months under normal use

- 1) Sterilize according to the manual
- 2) Produce 0.165MPa pressure inside the sterilizer
- 3) Use a screwdriver to push the safety valve handle to make it open about 2 seconds
- 4) Turn off the main switch, terminate the operation. Meanwhile, discharge the steam inside the sterilizer container
- 5) Open it when the pressure down to 0MPa.

6. How to change safety valve

Notice: Only specialists can use those maintenance methods. Avoid electric shock

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unless you are a professional. Must look up the manual when equipment malfunctioned and repair it according to the manual. And the manual has been provided the most professional maintenance methods.

- 1) It located at the front top left
- 2) Dismount the safety valve fixing screws, and remove the safety valve from the base of it
- 3) Exchange it with a qualified safety valve. Test the sterilization procedure

7. Temperature controller

Locate inside the device and one sterilizer with one temperature controller. It can be switched on and cut off the power to maintain a constant temperature in the heating and sterilization phase. It usually be used as a temperature alarm.

It will automatically cut off the power of heater when the boiler temperature above allowed range.

It will automatically switch on when the boiler temperature within allowed range.

8.How to rise working temperature of the temperature controller

Temperature controller is liquid expansion type, clockwise it to increase temperature range.(Notice: Equipment has already regulated, customers do not need adjust)

9.To our distinguished customers.

10.Any products may have fault, please use the real-time monitoring equipment operating the processing conditions. If abnormal occurred, please handle it according to the manual, as yet unresolved, please promptly notify our service center to avoid any losses.

11.After-sales service

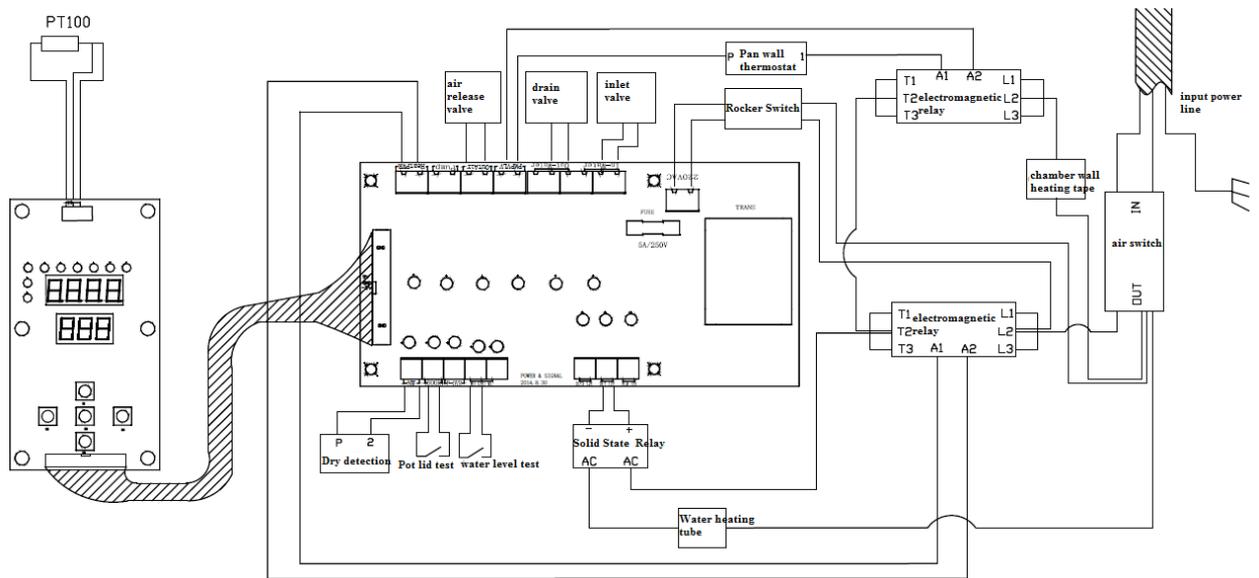
12. 1.One year free warranty for the whole machine from the date of sale(Invoice shall prevail),and services for life.

13. 2.Warranty card: When you need a normal consultation or repair, please bring warranty card and purchase invoices to our local service center and please safekeeping the warranty card .

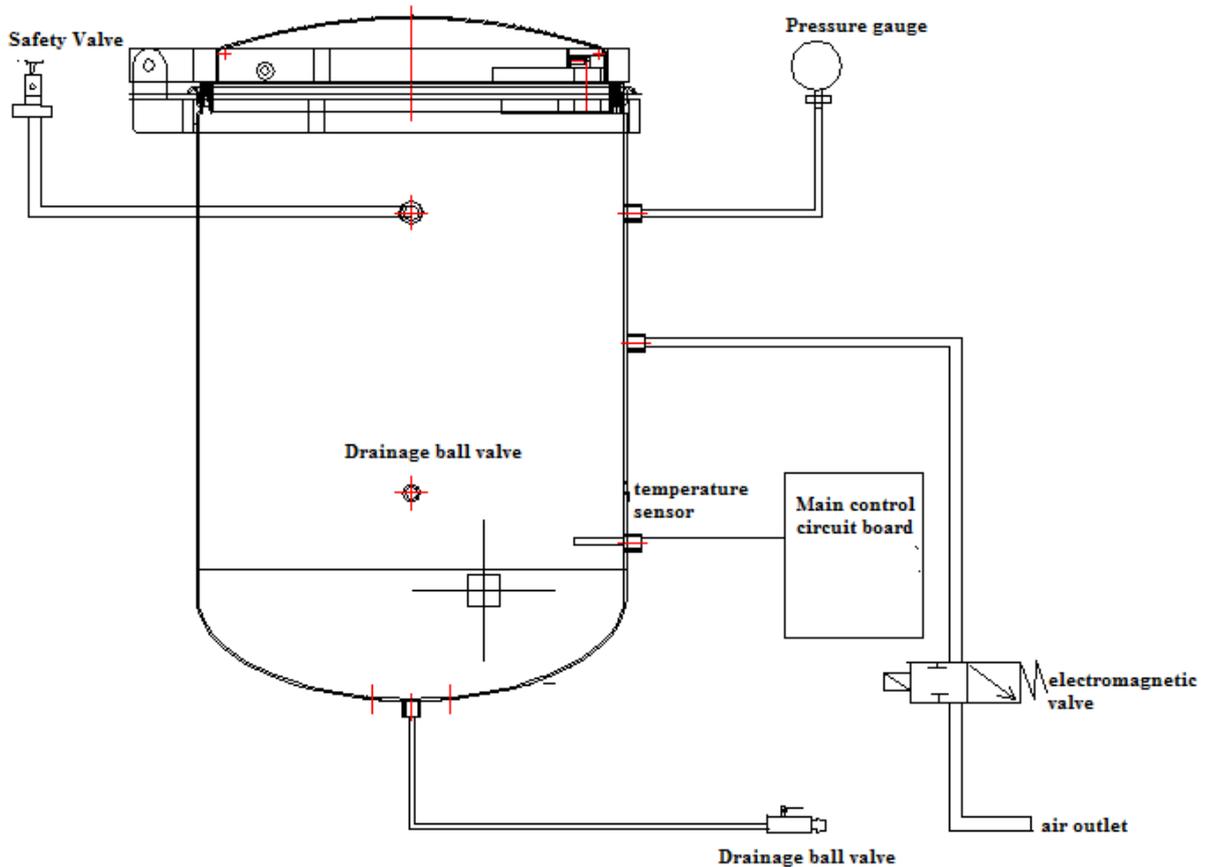
AppendixI Electrical Schematic Diagram

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Appendix II PID Pipeline Schematics



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